

212706US-2S

"RESPONSE" 37 CFR 1.116-
EXPEDITED PROCEDURE EXAMINING
GROUP 2814

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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
Kazuhiro SHIMIZU et al. : EXAMINER: WEISS, HOWARD
SERIAL NO: 09/925,418 :
FILED: AUGUST 10, 2001 : GROUP ART UNIT: 2814
FOR: NON-VOLATILE :
SEMICONDUCTOR MEMORY
DEVICE HAVING MEMORY CELL
ARRAY SUITABLE FOR HIGH
DENSITY AND HIGH
INTEGRATION

TECHNOLOGY CENTER 2800

JAN 29 2003

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REQUEST FOR RECONSIDERATION

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

In response to the Office Action dated October 29, 2002, Applicants request
reconsideration of the above-identified application:

REMARKS

Favorable reconsideration of this application in light of the following discussion is
respectfully requested. Claims 1-18 are presently active, with Claims 14-18 withdrawn from
consideration as directed to a non-elected invention. No claims have been amended
herewith.

In the outstanding Office Action, Claims 1-13 were rejected under 35 U.S.C. §103(a)
as being unpatentable over U.S. Patent No. 5,019,527 to Ohshima et al. (hereinafter "the '527
patent") in view of U.S. Patent No. 5,482,894 to Havemann (hereinafter "the '894 patent").

Claim 1 is directed to a semiconductor memory device comprising, *inter alia*: (1) a semiconductor body of a first conductivity type; (2) a stacked gate formed on the semiconductor body; (3) a contact material buried to be adjacent to the first side surface of the stacked gate; (4) a first insulating film formed on the second side surface and on the upper surface of the stacked gate; and (5) a second insulating film formed on the first side surface adjacent to the contact material, the second insulating film covering the entirety of the first insulating film.

Regarding the rejection of Claim 1 as unpatentable under 35 U.S.C. §103(a), the Office Action asserts that the '527 patent discloses everything in Claim 1 with the exception of the second insulating film formed on the first side surface adjacent to the contact material, and relies on the '894 patent to remedy the deficiency.

The '527 patent is directed to method of manufacturing a non-volatile semiconductor device, such as an EPROM. As admitted in the Office Action, the '527 patent fails to disclose a second insulating film formed on the first side surface adjacent to the contact material, and covering the entirety of the first insulating film, as recited in Claim 1. Rather, the '527 patent discloses that a polycrystalline silicon layer 19 formed on the silicon dioxide film 11 on the side surface of the stacked gate is used as an etch stop in the etching of the silicon dioxide film 21.¹ In addition, Applicants note that the device disclosed by the '527 patent does not have a contact formed by a self-aligning process.

Turning now to the secondary reference, the '894 patent is directed to a method of fabricating a self-aligned contact using organic dielectric materials in a semiconductor device having a single gate layer, such as a DRAM. In forming the contact hole, the '894 patent discloses that the dielectric overlayer 42 formed on the dielectric layer 30 is used as an etch

¹ See Figure 8H of the '527 patent.

stop in the etching of the organic-containing dielectric layer 32, and to provide minimal protection for substrate 20 during the O₂ plasma etch that removes organic-containing material from insulating gap 29.² The Office Action asserts that the disclosure of the '894 dielectric overlayer 42 reads on the claimed second insulating film.

The stated motivation for combining the teachings of the '527 and '894 patents is derived from the '894 patent, which states that the dielectric overlayer 42 is added to provide "minimal protection for substrate 20 during the O₂ plasma etch."³ However, Applicants respectfully submit that this statement would not have provided motivation to one of ordinary skill in the art to modify the '527 device by forming a second insulating film on the first side surface adjacent to the contact material, wherein the second insulating film covers the entirety of the first insulating film 12.⁴ Applicants note that such a modification to the '527 device would require the removal of the fourth polycrystalline silicon layer 19 and either (1) the extension of layer 11 over the stacked gate to cover layer 12, or (2) the removal of layer 11 and the addition of a second insulating film covering the first side surface adjacent to the contact material and covering the first insulating film 12. However, there is no teaching or suggestion that the overlayer 42 disclosed in the '894 patent would be of import in a modified '527 semiconductor device. Applicants note that providing protection for the '527 substrate during a O₂ plasma etching that removes organic containing material from the insulated gap is not necessary, since this step is not performed in the '527 patent. Thus, Applicants submit that such a thermal oxide or silicon nitride film (42) would not be needed and would serve no purpose in the '527 device. In contrast, the polycrystalline silicon layer 19, which would

² See Figure 2D of the '894 patent.

³ '894 patent at Column 5, lines 18-20.

⁴ See Figure 8H of the '527 patent.

presumably be removed by the suggested combination, is necessary for the etching of the silicon dioxide film 21 in the '527 device.

Thus, Applicants submit that the Office Action is simply restating the disclosed rationale behind a step in the method of manufacturing the '894 device as motivation to combine the '527 and '894 patents, without identifying that the associated step and/or structure disclosed by the '894 patent is in any way related to the '527 patent or the claimed invention. Rather, Applicants respectfully submit that the Office Action has selected the '894 patent only because it discloses an insulating film 42. Such hindsight reconstruction of Applicants' invention cannot be used to establish a *prima facie* case of obviousness. Accordingly, Applicants respectfully submit that a *prima facie* case of obviousness has not been established and that the rejection of Claim 1 (and dependent Claims 2-5) should be withdrawn.

Independent Claims 6 and 10 recite limitations analogous to the limitations recited in Claim 1. Accordingly, for the reasons stated above for the patentability of Claim 1, Applicants respectfully submit that the rejection of Claims 6 and 10 (and associated dependent Claims 7-9 and 11-13) should be withdrawn.

Thus, it is respectfully submitted that independent Claim 1 (and dependent Claims 2-5), independent Claim 6 (and dependent Claims 7-9), and independent Claim 10 (and dependent Claims 11-13) patentably define over the '527 and '894 patents.

Consequently, in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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EXPEDITED PROCEDURE EXAMINING
GROUP 2814"

Docket No.: 212706US-2S

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WASHINGTON, D.C. 20231



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RE: Application Serial No.: 09/925,418
Applicants: Kazuhiro SHIMIZU, et al.
Filing Date: August 10, 2001
For: NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE
HAVING MEMORY CELL ARRAY SUITABLE FOR HIGH
DENSITY AND HIGH INTEGRATION
Group: 2814
Examiner: Weiss, H.

SIR:

Attached hereto for filing are the following papers:

**REQUEST FOR RECONSIDERATION
LETTER TO THE OFFICIAL DRAFTSMAN
11 SHEETS OF FORMAL DRAWINGS**

Our check in the amount of \$0.00 is attached covering any required fees. In the event that any variance exists between the amount enclosed and the Patent Office charges for filing the above-noted documents, including any fees required under 37 CFR 1.136 for any necessary Extension of Time to make the filing of the attached documents timely, please charge or credit the difference to our Deposit Account No. 15-0030. Further, if these papers are not considered timely filed, then a petition is hereby made under 37 C.F.R. 1.136 for the necessary extension of time. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

A handwritten signature in cursive script, appearing to read "Gregory J. Maier".

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